

107

THE

CAUSES AND OPERATIVE TREATMENT

OF

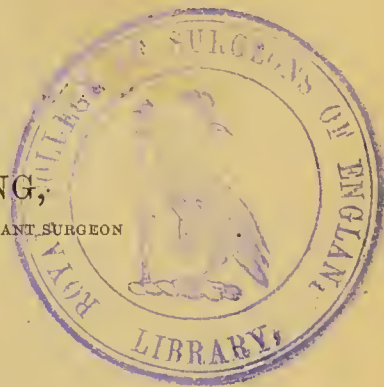
DUPUYTREN'S

FINGER CONTRACTION.

BY

DR. OTTO W. MADELUNG,

LECTURER OF SURGERY AT THE UNIVERSITY, AND ASSISTANT SURGEON
AT THE UNIVERSITY HOSPITAL, BONN.



TRANSLATED FROM THE GERMAN.

LONDON:

TRÜBNER & CO., LUDGATE HILL.

NEW YORK: G. P. PUTNAM'S SONS.

1876.

[All rights reserved.]

PRINTED BY BALLANTYNE, HANSON AND CO.
EDINBURGH AND LONDON

FINGER CONTRACTION.

I HAVE of late had rather frequent opportunities of meeting with persons from different countries, and of various social grades, whose hands were affected with the disease first described and explained by Dupuytren—viz., of *Contractura palmaris*, the “contraction of the Palmar fascia” of British surgeons. Almost all these individuals had sought surgical help, and had, especially at the beginning of the complaint, conformed to any course of treatment proposed to them. According to their position in life or their means, either watering-places, and costly extension apparatus, or hand-baths, and the use of ointments, had been recommended to them. One gentleman showed me the cicatrices of subcutaneous division of the cords of the palmar aspect of the fingers. The most various methods of treatment had been followed by the same result—viz., the disease had remained unchanged, or continued to spread to other fingers and to parts of the palm of the hand hitherto unattacked. The majority of the patients had accustomed themselves to regard the complaint as one of the many thought to be inseparably connected with advancing age. Many had abandoned the occupation which they found themselves unable to follow on account of the contraction of the fingers. Some found consolation in the reflection that an otherwise unrecognisable gouty process had become localised in the hand, and that the contraction was, so to speak, “a safety valve,” diverting the disease from more vital parts of the body. Others stated that they had demanded the performance of an opera-

tion ; but they had either been told that sinews had to be divided, and that then the fingers would become stiff, or the danger of the operation to life, and the tediousness of the curative treatment, had been dwelt upon.

The surgeons of all countries seem to be unanimous in their opinion of the inutility and danger of the operative treatment of the disease in question. The operation for the relief of contraction of the Palmar fascia is hardly ever mentioned in the numerous recently-published statistical reports on the results obtained in the great surgical hospitals. Only one case of the kind, which was treated by subcutaneous incision, is mentioned in Billroth's* Report of the Zurich and Vienna Clinical Hospitals. The current surgical handbooks, it is true, mention the operative methods of Astley Cooper, of Guérin, Dupuytren, Goyrand, and Malgaigne. But according to them "the operation offers no guarantee of success." It is followed by an obstinate "inflammation and ulceration." Pitha says that every surgeon of experience is opposed to the operation. Bardeleben declares that real cures have not been achieved by either subcutaneous division or any other method of operative treatment. In lieu of any kind of operation, the extension by apparatus is particularly mentioned, especially the moveable, and at the time of its introduction so warmly recommended, hand apparatus by Enlenburg.† Pitha writes, "Unfortunately the success of even the best possible combination is frequently marred by the want of the necessary perseverance on the part of the patient."

I had, in the Surgical Hospital at Bonn, opportunities of observing the treatment of a series of cases of this kind. I saw the treatment of Professor Busch followed by favourable results, and never produce injurious consequences. An account of this treatment, as well as a comparative criticism of the other methods of treatment, seems to me, therefore, a useful undertaking. Some notices from the history of the patients, some thoughts on the still obscure cause of the

* v. Langenbeck's Archiv. x. p. 646.

† Berliner Klin. Wochenschrift, 1864, p. 224.

complaint, may possibly present points of interest, though I have nothing new to add to the sketch of the disease already so accurately given by Eulenburg.

As insisted upon already by Eulenburg, *Contractura palmaris*, in opposition to Dupuytren's assertion, is not found solely among persons gaining their livelihood by hard *manual* labour. I have seen it in cases of commercial men in easy circumstances, and also in that of an old lady, who during her long life had used her hands only for the very lightest work. Chronic inflammations of the palmar aspect of the hand, which have set in long before the beginning of the contraction, seem to me, however, to be of much greater etiological importance than has hitherto been assumed. A gentleman, who curiously enough, though only in his thirtieth year, had the little finger of his right hand attacked by this disease, told me, that he remembered having, when ten years old, injured the soft parts above the metacarpo-phalangeal articulation of the same finger, by a blunt nail—that the wound had bled profusely, but had soon cicatrised, and that he had long after had a small indurated and painful place on it. But it was only twenty years after that the contraction of the finger in question became apparent. Another gentleman, already somewhat advanced in life, had constantly worn his wedding-ring on the ring-finger of his right hand. It became more and more difficult for him to remove it, in consequence of which it was left for years in the same position. Whilst from home on a pleasure tour, this gentleman found the pressure of the ring so unbearable that he got it filed through and removed from the finger. Several months after the removal of the ring my informant observed that he could not extend the ring-finger completely, and somewhat later that the little finger also of the right hand became slightly flexed. About three or four years after these appearances in two fingers of the right hand, the ring finger and the Palmar fascia of the *left* hand, showed signs of a morbid change,—and a contraction of the ring-finger, with a thickening of the soft parts of the first phalanx, now obtains to a

greater degree than in the bent fingers of the right hand. The patient considers that the disease of the left hand is also due to an external injury. His account is that at the time when his right hand was already affected, he became acquainted with a work on "Finger-Gymnastics" by a Mr. Jackson, and that for a considerable period he most energetically practised the exercises recommended therein. There was one among them—viz., the pulling of the fingers violently asunder by the insertion between them of cylindrical corks. The use of mineral waters and general dietetic measures recommended by the surgeons proved quite useless. I believe that patients of education will often give a history of acute or chronic inflammatory processes having preceded the disease, and that with such knowledge—if not all—still a great deal of this etiologically obscure malady may be explained.

I had once an opportunity of examining the hands of a pilot, and found that contraction had, in addition to other fingers, spread to the thumbs of both hands. Most surgeons state that they have never observed contraction of the thumbs. Dupuytren and Malgaigne each saw it only once.

By availing one's self of the opportunity offered, for instance, by a poorhouse infirmary of large size for the examination of the hands of elderly people, one is struck with the frequency among men and women, and by no means only among smiths and day labourers—of a moderate permanent bending of the fingers of both hands, with the exception of the thumbs, and it is astonishing how many of the old folks will be found unable either actively, or passively, to extend their fingers completely. This general contraction appears to trouble them very little, or not at all. They never ask for surgical aid. In these cases, but also in those of many other old people, the entire smoothness of the integuments of the palm, the absence of the smaller and larger *monticuli* even when the hand is bent, will strike the observer. Copious small fatty aggregations are found in the Palmar fascia of children, and also of adults under the skin of the palm, "ingrained" (*Bardeleben*), as it were, between the fibres of

the connective tissue of the Palmar fascia and the numerous fibres ascending from it to the skin. Every interstice is filled with them, every bending of the hands causes shifting of these fatty particles within distinct limits ; whilst, when the hand is stretched, the palmar surface is on the whole smooth, and only the monticuli, so carefully studied by chiromancers, are pressed forward by the sides of the metacarpal bones through the tension of the tips of the Palmar fascia. The bending of the fingers pushes forward mass upon mass of adipose tissue. Every one desirous of obtaining in the dissection-room an anatomically clear picture of the course of the fascia, or of the distribution of the nerves in the palm of the hand, is aware of the difficulty of the removal of these particles of adipose tissue, especially between the *Linea mensalis* and the flexion-furrow corresponding with the metacarpal articulations of the fingers. With advancing age these adipose masses disappear regularly. They become more sparse even with people who have a pronounced adipose tendency. Therefore the hands of old individuals should be used in preference for such anatomical preparations, as in them a part of that laborious labour of preparation is already accomplished.

In a similar way, and even in earlier life, fatty tissue is lost, when the volar side of the hand either alone, after an injury, or conjointly with the forearm, becomes the seat of an acute or chronic inflammation, even in cases where ulceration or the formation of a sinus did not occur. It is clear that here, as well as in other parts of the body, the function of the fat is to moderate the pressure, to which the tissues of that part of the body are exposed, and to distribute it over a larger area. By the disappearance of the fat, single regions of the palm become more exposed to a constant pressure, become more easily injured, especially those which are situated opposite the firm part of the bony structure of the hand, *e.g.*, the heads of the metacarpal bones and the flexor-tendons. The frequent injurious exposure evidently excites the now unprotected tense connective tissue of the palm to a state of chronic

inflammation, leads to *hyperplasia* of the normal fibres, and finally to their shrinking, with consequent permanent bending of the fingers. It is clear that as soon as this shrinking of single parts of the Palmar fascia has attained to a certain degree, and that these parts are projecting beyond the rest of that fascia, and when in spite of this the hand continues to be used for manipulating or supporting an instrument, then it is clear, I say again, that the numerous consequent exposures to injury will act more and more on the individual diseased part, and incite it to further change. Only thus can we conceive that when the contraction of the fingers has attained such a degree as to make their use impossible, the process of shrinking comes to a standstill, and the ingrowing of the tips of the fingers into the palm (observed by Eulenburg and Wernher) occurs so rarely. I saw a case, where the inbending of the ring-finger towards the palm, to such a degree as to make the hand almost wholly useless, had existed without perceptible increase for thirty years. Only thus can I explain to myself that, after the removal of the prominent connective tissue in the inner hand by the operation hereafter to be described, the disease has no returned for years.

I think that the process is thus better and easier explained, at least in a number of cases, than has hitherto been done. This will be more especially the case in the symmetrical occurrence of contraction of the fingers of both hands, in the appearance of contraction in the hands of individuals who perform but little manual labour; perhaps also, as is so positively asserted by some, in its occurrence among men who have suffered from rheumatism and gout, and consequently of disturbance of the nutritive process. It is also possible that the hereditary theory asserted by others thus becomes more plausible.

I have not been able to come to a conclusion as to the anatomical causes of the disease by the complete dissection of entire hands. Surgeons attached to provident institutions for old people might have better opportunities in this respect. However, the free insight into the seat of the disease, afforded by

Buseh's operation, demonstrated the correctness of the Dupuytren-Goyrand statements in the most evident manner. The fine distinction between contractions, due to the shrinking of the surface of the *Aponeurosis palmaris* or of the fibres ascending from it to the integument, is subtle and useless. A careful examination, but not a mere subcutaneous division of the protruding fibres, will invariably show that both parts are morbidly attacked, that fibres leading from the *aponeurosis* to the sheaths of the tendons have also shrunk. In one case the one part exercises the greatest effect on the bent position of the fingers, in another the other.

For it is evident, that even in cases where Goyrand's "brides" first begin to shrink, the permanent bent state of the hand will be followed by shortening of the Palmar fascia itself.

The disease claims imperatively the help of the surgeon. Only those who have seen but few such, and have superficially listened to their complaints, can regard the desire of the patients to be freed from the "little deformity" as uncalled for. Most men, even those who are not compelled to live by the labour of their hands, are depressed by constantly recurring inconveniences. The crooked finger gives trouble at every change of the dress, on the raising of any heavy object. The finger is in the way whenever an unconscious movement is made, as, for instance, in the opening a door, or on entering a carriage; and much pain is caused by the tension. To persons unable to abandon their trade, and compelled to grasp and hold the handle of a tool with the diseased hand, every exertion becomes painful.

The following case showed me how urgent the desire to have an operation performed can become with such sufferers. A middle-aged gentleman came to Bonn, requesting operative help because of the permanent crookedness of his little finger. This was one of the first cases operated on at Bonn. It was considered necessary to warn him that possibly an operation might render the rest of the hand useless; but he declared his firm resolve to have it performed at any risk.

He stated that he was a poor teacher of the piano, and entirely dependent on the full use of his hands. He could not any longer touch an octave, &c. &c. Received into the hospital as one of the lower classes, he maintained successfully the character of the poor teacher of piano. The result of the operation was fortunate. Even before the wound was completely healed, he was able to use his hand to its former extent in playing the piano. Quite accidentally we learned, after his discharge from the hospital, that the individual was certainly an enthusiastie player of the piano, but besides a man remarkably well off. He had previously consulted surgeons, and had been for years under treatment. The operation had been refused on account of the presumptive danger, and the assumed small inconvenience caused by the contraction.

Let us suppose the permanent bend to be, as often happens, confined to the ring-finger of one hand: After the patient is placed under the influence of chloroform, his hand is laid on its back on a firm support. The hands of an assistant fix the forearm and the tips of the fingers. A piece of skin of an acute triangular form is raised, its base falling into the furrow, separating the bent finger from the palm of the hand. Its apex meets that point of the palm of the hand where, with the utmost stretching of the same finger, diseased fibres of the connective tissue of the palm of the hand are clearly discernible. The piece of skin is raised beginning at the top, from the parts beneath, with the most extensive removal of the subcutaneous connective tissue. During the division of this tissue, that is to say, of the numerous firm connecting fibres which ascend from the Palmar fascia to the skin, the bent finger already allows itself to be somewhat stretched. Then the operator pushes the scalpel along the whole piece of the Fascia thus laid open, with small incisions into every place where firmer fibres show a stronger tension. Thus an entire portion of the Fascia may be incised without danger of a lesion of the sheath of a tendon. The finger slowly stretches until extension is thoroughly accomplished. The piece of skin then contracts considerably,

rolling itself with its point a little inward. During this extension, part of the flat wound is uncovered. It is often possible, however, to unite the lower points of the double-winged wound by sutures, by drawing together the edges of the skin, and thus to diminish the wound. But if the sutures should in any way stretch the skin, the sewing had better not be attempted. The operation hardly causes any bleeding. A light bandage closes the wound. The hand is then kept by the patient in a sling, without the slightest attempt to preserve the extension. The pain is thus reduced to a minimum in the immediate neighbourhood of the wound, and the patients are hardly ever feverish. Extension movements with the finger are only made when the wound has entirely granulated, and then only in a light, gentle way. At first, wood cylinders of various sizes are laid into the hand; later, the hand is stretched on a back-splint. 'Active and passive movements are now to be made in and during the time the hand-bath is used for the cleansing of the wound.

More complicated apparatus than the above are never required. The healing of the wound, accelerated, perhaps, by skin-grafting, is accomplished in three or four weeks. The movements made with his hand by the patient on the resumption of his former occupation, and which his desire to prevent a possibly new contraction causes him to make of his own accord, the occasional nightly extension of the hand on a board, suffice to ensure and complete the desired result. Nevertheless, I must confess that, among the cases observed, there was none in which bony deposits on the dorsal part of the bent phalanges had taken place. Their removal would, at all events, require more regular passive exercises.

In the case of extension of the morbid change to several fingers, it will be well not to attempt too much during one operation, in order not to enlarge the wound too much. But it will be quite possible to cut the impeding fibres of two fingers in one act and with the formation of *one* triangular piece of skin, as was done in a case where the third and fourth fingers were affected, which will presently be mentioned.

The advanced age of the patients formed no counter-indication for this operation. A man aged sixty-six years, inmate of the infirmary of a small neighbouring town, and altogether in a wretched condition, came to Bonn with a permanent contraction of the third and fourth fingers of the right hand. Although he was not compelled any longer to live by hard labour, he insisted on an operation. This was performed by the elevation of *one* euneiform flap of skin on the 13th November 1873. The wound was nearly healed on the 7th December, and the stretching of the finger on a splint had been made quite tentatively, when the patient became tired of the hospital and disappeared. Fully a year afterwards I met the old fellow accidentally. His hand since his flight from the hospital had remained without any medical treatment whatsoever. Nevertheless, the fingers of the whole hand could be stretched and bent uniformly, and were fit for any kind of work.

As before said, we never observed any bad effects from the operation, no burrowing of pus, no inflammation of the sheaths of the tendons, above all, no *Trismus*. Only on one occasion, probably in consequence of too early attempts at stretching, a piece of the top of the skin triangle sloughed.

The immediately favourable results of the operation did not diminish in the course of time. Nor did the broader or narrower cicatrix existing in the vola of the hand cause any inconvenience. I requested lately a friend and colleague to examine the above-mentioned old hospital inmate, and to report to me the result. He wrote as follows:—The right hand of the baker H. shows in the palm a long, slightly fissured, here and there stellate cicatrix, which bifurcates towards the fourth finger. The mobility of the fingers is unimpeded in every direction, and the extension and flexion even of the third and fourth fingers are perfect. The tip of the third finger (when flexed) touches the root of the hand, and the same finger can be stretched quite straight. Pressure is fully executed with the entire hand and the individual fingers, and in no manipulation does the member refuse its function. Only

a little weakness of the fingers treated, if compared with those of the other hand, has remained.—Such, then, is the result of an operation performed two years previously, without the slightest possibility of an after-treatment. But I must not conceal the fact, that the operation does not afford absolute guarantees against the occurrence of the malady in another place. The before-named musical enthusiast at my request presented himself to me again a short time ago. He stated that the use of the hand had appeared to him entirely unimpeded for six months after the operation, but that since then the morbid process had set in again in the little finger. He said that now, three years after the operation, he could still touch the octave on the piano, but that he found again his finger sometimes gliding inwards, and thus between two keys. The cicatrix caused by the operation had never given him the slightest trouble. On examination, the little finger exhibited itself bent afresh, but on this occasion the bending was not as before in the metacarpo-phalangeal articulation, but in the articulation between the first and second phalanx. Whilst the first phalanx could be entirely extended and flexed, the second phalanx, after the utmost stretching, remained firm at a right angle to the first phalanx. The soft parts over the volar side of the first phalanx were thickened, tight, and the skin not foldable. The skin over the metacarpo-phalangeal articulation, although in it was the rather puffy cicatrix (this was the case in which a piece of the skin sloughed), was moveable and foldable. There is no reason why the new deformity should not be attacked by a new operation, and be removed either permanently, or at least for some time.

The favourable final results of Busch's method, as recorded above, contrasted with the previous ones known, seem to me easily explicable. We omit a comparison with the formerly recommended division (Guérin) of the flexors as not being conformable to our present knowledge of the malady, and as mutilating in its effect, for the subsequent manipulating power of the hand. The same holds good for the division of the muscles recommended by Malgaigne. Dupuytren made

a transverse cut to the extent of ten lines through the skin and *Aponeurosis palmaris*, opposite the metacarpo-phalangeal articulation of the crooked finger, and in another case a semi-circular cut at the base of the finger, and a similar one an inch and a quarter below the palm of the hand. Astley Cooper sought to attain the desired object by subcutaneous division of the impeding fibres. Goyrand made longitudinal cuts through the hand, above each projecting subcutaneous fibre. The edges of the skin were pushed aside and removed by some cuts from the surface of the fibrous cords. These cords or fibres were divided. Only if floating long bits of connective tissue show themselves, they should be cut out. The skin incisions were then sewn together.

These three modes essentially required orthopædic after-treatment, and consequently complicated machines. This alone shows clearly that the operations furnished only imperfect results, and that they but partially removed the impediment, preventing extension-movement of the finger, and further, that none of them sufficiently guarded against the reappearance of the disease.

Each of these methods creates conditions unfavourable for the healing of the wound caused by the operation; Cooper's, least of all, presuming that the skin-wound closes quickly after the subcutaneous division. But this is not to be expected in the palm of the hand, especially in connection with this disease. The skin in this region is only movable naturally with difficulty, and by its connection with the diseased tissue below it, becomes still more immovable and rigid. Billroth's case shows the danger of subcutaneous operation in this region. The division was followed by considerable suppuration, to heal which three months were required. Afterwards the state of the hand was exactly the same as before the operation. Goyrand's method causes sinuses in a tissue no longer normal, from which burrowings of pus may take place under the integuments of the palm in the immediate neighbourhood of the flexor tendons.

In contrast to this, Busch's method presents a wound,

plane and even, without sacs, from which, with simple bandaging, no burrowings of pus can take place. It does away with all danger by accidental side laceration. Every bleeding vessel in the open wound can easily be caught and tied. With cautious dissection every tendon sheath can be seen and avoided.

I must most particularly caution operators against all movements and all stretching on a hand-board before the complete formation of granulations in the wound. All surgeons, with the exception of Stromeyer, followed up the incision or excision immediately by applying various extension apparatus. Considerable pain was thereby inflicted on the patients. In proof of this one need only read the remarks in Dupuytren's reports:—"Gêne légère causée par l'extension continuelle; le lendemain matin le dos de la main est le siège d'un empatement peu étendu, résultat de la compression de la machine." Also after the application of a new machine: "L'irritation se réveille, la douleur redouble, la main est envahie par un gonflement général." Our patients were spared these pains and inflammations.

In the year 1858 Busch* called attention to the extraordinary elasticity of granulations, and also to the use derivable therefrom in the treatment of old faulty cicatrices, especially cicatrices from burning. Owing to the almost exclusive use in the Rhenish Provinces of iron stoves, deformities of the palm of the hand by burns are very frequently seen in the hospital of Bonn. In their treatment the principle of first, after incision or excision of the cicatrices, letting the wound arrive at the stage of granulation before beginning the extension movement, has permanently proved itself the best.

I mention, but only by the way, that in operating on these cicatrices caused by burns, the laying open of the tendon sheaths was also almost constantly practised; that in spite of the longer duration of the process of healing and of the more considerable size of the wound, adhesions of the tendons by inflammation or destruction of their sheaths never took place.

* *Annalen des Charité-Krankenhauses*, 1858, p. 3.

The cuneiform shape of the piece of the skin must on no account be departed from, and the operator must not be misled by a more extended disease in the palm to give it another shape—for instance, a rectangular one. Dieffenbach* called attention to the utility of an oblique division of cicatrices of the palm and fingers. The cuneiform shape of the piece of skin, *i.e.*, the doubly oblique division, permits a lateral shifting of the edges of the wound, and guards satisfactorily against possibly unfavourable consequences as regards the extension of the fingers (by contraction of the skin cicatrices).

In conclusion, I hope that, in view of the relative frequency of Dupuytren's contraction, in view of the urgency of an operative treatment, and of the facility of the method here explained, reports of equally favourable results obtained by other surgeons by Busch's method will soon confirm the correctness of this short communication.

THE preceding paper was written at the latter end of 1874, and appeared first in No. 15 of the "Berliner Klinische Wochenschrift" for 1875. Since then, and probably owing to the publication of my remarks, a considerable number of persons afflicted with *Dupuytren's finger contraction* were sent for treatment to the Bonn Hospital. Some of these patients were operated on in the course of last year; but I refrain from speaking on this occasion of various particulars which struck me as pathologically new and interesting, and confine myself to a few remarks on the additional experience acquired in regard to the operation itself.

In accordance with what has been previously stated, I was not surprised to find that the treatment which the new patients had undergone before coming to Bonn had been totally unavailing. Still it was matter of interest to study their cases, as tending to confirm our conclusion as to the directly injurious effects of some of the methods followed—

* Operative Chirurgie, vol. i. p. 225.

methods which had hitherto been considered as at least innocuous. Two of these methods especially I must now characterise as not merely useless, but farther, as likely, under certain circumstances, to prove seriously injurious. I refer, first, to the plan of treatment by the gradual extension of the contracted fingers, whether by means of manual traction or by mechanical contrivances; and, secondly, to the electrical treatment usually followed. All the patients in whom the morbid state of the Palmar fascia had caused considerable contraction of one or more of the fingers, had already had attempts at cure made by means of gradual extension of the affected digits; but in every one of them the disease appeared to have been aggravated, rather than bettered, in the precise ratio of the vigour of the efforts at extension made by the Procrustes beds recommended to them. Patients of education, and having no hostile feelings towards their former medical advisers, were unanimous in stating that every new application of the extension process had been followed by intense pain, and the pain in turn by a decided increase of the contraction. One gentleman, who, at the unusually early age of twenty-three, first noticed signs of a morbid change in the Palmar fascia, declared that he had contracted the malady as a boy, when he was enjoined, and constantly attempted, violently to pull asunder his fingers, which were short and little adapted to abduction, in order to gain the span and flexibility needful for playing on the pianoforte. But leaving this merely personal opinion entirely out of sight, the patient—who, in addition to the use of the waters of Nauheim, Wildbad, Wiesbaden (twice), Monzummano, and Ischia, had submitted to the violent stretching of a finger under the influence of chloroform, to the gradual extension by machines of various kinds (Eulenburg's among the number), and had, moreover, been in the habit of constantly trying forcibly to stretch the affected fingers with his other hand—was affected in his thirty-sixth year with the Dupuytren contraction in the highest degree. The disease had, in fact, attained such a degree of intensity that the patient had to abandon his military career by reason of his incapacity to carry arms, and because

his hands had become useless for a number of the commonest and most necessary purposes.

If the malady be looked upon as due to a chronic inflammatory process affecting the fascia of the palm of the hand—and in the present state of our knowledge we are, I believe, compelled to do so—it is obvious enough that all attempts at traction must act as excitants of inflammation severe in proportion to the degree of force applied, and consequently that every new attempt in this direction must be followed by an aggravation of the disease.

Theoretically considered, the same reasoning declares against the use of electricity. I do not know whether the electrical current directed through the contracted portions of the fascia, with a view to affect their solution or softening, has been particularly recommended by any author, but I have seen two patients who had been thus treated by different physicians for some length of time. One of them had for several months been treated by means of the constant current applied daily for about a quarter of an hour. The electrodes of the battery in this case were at first applied superficially to the skin of the palm for fourteen days consecutively; but later, whilst the one electrode was applied superficially, the other, furnished with a gold needle, was inserted into the diseased tissues. The second patient was treated daily by means of galvanism for six months, partly with needles stuck into the contractions, and partly applied externally. I have never seen higher degrees of contraction than I observed in these two cases, and in so far as I know, more aggravated forms of the disease have never been described. Almost the entire palms, as well as the palmar aspects of the phalanges, were diseased. Both patients were operated on at Bonn, and the procedure required showed to what an unusual depth, and in how irregular a manner, the palmar and digital fasciæ had become affected. In no place were single thickened fibres found among or by the side of the tissues in their normal state. On the contrary, all the soft parts, from the skin to the sheaths of the tendons, and from these to the bones, seemed to be changed into a connected continuous rigid substance.

I therefore believe that I am justified in advising patients who cannot be operated on according to Busch's method, to desist from any other treatment, however innocent it may appear. We have had repeated calls from patients, as may be imagined, whose fingers were not contracted to such an extent as to make an operation necessary. They were advised not to attempt any manual or mechanical means of extension, but to avoid, in so far as this was possible, all acts requiring strong efforts of the fingers, and to give up such mechanical occupations as expose the palm of the hand to the pressure of tools and the like. Whether this advice has protracted the suffering of our patients I cannot say, as the time that has elapsed since it was given has been too short to permit of an opinion being formed. In any case, the observation already mentioned, that any further contraction of the fingers ceases as soon as the disease has reached such a height that ordinary occupations have to be abandoned, seems to support this expectative method of treatment.

And here I say again that I have constantly seen the operative treatment by Busch's method crowned with the most brilliant success. In some of the slighter cases the cure was effected by a single operation, and without difficulty. The patient, whose case is mentioned on page 13, made up his mind to submit to a second operation for the relief of a contraction of the second phalanx of the little finger, which had taken place since he had been under treatment before. On the 6th December 1875, accordingly, the fibrous bands which impeded motion were divided, and the first phalanx straightened. The operation consisted in the detachment of a triangular flap of skin, the basis of which was in the furrow of the first phalangeal articulation and the apex at the ulnar end of the furrow, which marked the metacarpo-phalangeal articulation. This patient left the hospital as early as the 18th of the same month cured. The success of the operation is perhaps better vouched for by what the patient himself has written to me on the subject, than it would be by my medical report and verdict.

"Before the last operation," he says, "I could hardly touch

an octave on the piano, and could not reach a sixth with the fore and little fingers at all. At present I easily touch a ninth, and nearly reach a tenth. The following chords, which I could not formerly strike at all, are now quite easy :—



But the operation in the cases mentioned above, in which the disease of the fascia extended over a wider area of the palm of the hand, was surgically more interesting than in this and in other cases where one or two fingers only were contracted. Two patients of this kind came to the hospital. In the one, the middle and ring fingers of the right hand were completely flexed, the fore and little fingers being also affected to a moderate degree, whilst the thumb was drawn in towards the palm, without contraction of the phalanges. In the left hand, again, the little finger was completely bent, the ring-finger moderately so, and the middle one more slightly.

In the case of the second patient, the fore and ring fingers of the right hand were completely bent. Of the left hand, the little finger was also completely bent. The thumb was so much drawn in towards the middle of the palm, that its only possible motion was between the first and second phalanges. In these two cases not only was the fascia of the palm of the hand, but the fibrous tissues of the inside of all the fingers were also diseased in a high degree.

These complicated cases, such as had not even been treated before at Bonn, demonstrate more particularly the propriety of attending to what is said on page 11, namely, that too much should not be attempted in the way of operation at once.

Patients labouring under such extensive affections of the hands should be prepared, before any operation is attempted, to understand that it is unadvisable to attempt accomplishing everything at once, or by a single operation. One point which I should more particularly insist on is this, that no attempt should be made to stretch and straighten the crooked

phalanges immediately after the flap of skin and subjacent diseased tissues is raised. It is time enough to attempt this when the wound in the palm is healed. Then the straightening of the phalanges of two or more diseased fingers may be simultaneously and easily accomplished.

Two essential improvements have been introduced into the operative method followed in the hospital of Bonn during the last eighteen months. By the first of these the operation is greatly facilitated. By Esmarch's bloodless method the surgeon may proceed step by step, slowly and surely, without a drop of blood being shed, neither sponges nor anything else obscuring his vision for a moment. Every diseased fibre can be examined carefully according to its anatomical importance and direction before it is divided. The tendons shine through their uninjured sheaths.

The second improvement consists in securing the rapid and favourable healing of the wound by the employment of the antiseptic treatment as taught by Lister. This method of treatment was introduced several years ago into our surgical hospital, and has from year to year furnished increasingly good results. It was natural to call its beneficial aid into requisition in connection with the operation we are discussing, and to secure the healing of these wounds in the "aseptical" manner without the occurrence of suppuration. Lister, to whom I sent a copy of my original paper, wrote to me as follows:—"The method will yield, if possible, still better results under antiseptic treatment, under which the bloodclot in the small open wounds will form scars much less disposed to contract."

The first operation for *Dupuytren's contraction*, under antiseptic precautions, was performed on the 10th August 1875. The patient, aged fifty, whose middle finger of the left hand was liberated from permanent flexion, lived during the time necessary for healing the wound at an hotel. There was in his case literally a total absence of any kind of pain and fever; and the same thing occurred in all the operations performed antiseptically afterwards. The cicatrisation took place quickly, without constitutional disturbance, and, with a minimum of

discharge, the complete absence of any kind of putrid odour, was especially agreeable to the patient himself. It is a well-known fact, that few wounds occasion so unpleasant an odour as those of the fingers and hands, in which the thick epidermis in the neighbourhood of the wound goes on slowly macerating under the use of the hand-baths and the usual dressings. The disinfecting lotions commonly used in such cases do no more than mask the bad odour temporarily. When Lister's system is adopted, there is not the slightest trace of a foul smell.

I go so far in my confidence in Lister's mode of dressing, that I do not consider a lesion of the sheath of a tendon, which in the operation by Busch's method in the ordinary slight cases can certainly be due only to negligence, but which in severer cases may occur in the hands of even the most careful surgeon, any great misfortune. I believe, that in spite of such an accident occurring, the success of the operation may be complete; in other words, that tendons, in spite of the lesion of their sheaths, may remain perfectly free and unimpeded in their motions. My confidence in this direction is justified by a tolerably large number of observations. There are in the neighbourhood of Bonn two important jute spinning-mills. In them a considerable number of children and women are occupied in distributing raw jute over a pounding apparatus worked by machine-power. It is a common occurrence, that in disentangling portions of jute already caught by the knives and hooks of the apparatus, which lie parallel to one another, the fingers or hands of the workers are seized by the machine. The power is not generally great enough to lop off parts of the hand completely, but it is sufficient to cut the skin and the soft parts into parallel stripes of the breadth of about an inch. The bones and also the tendons generally resist; but the latter are often denuded to a great extent of their sheaths. In these cases splendid results are obtained by the conservative method, aided by the antiseptic treatment. I have treated cases in which one side of the sheaths was literally rased from off the dorsal or volar tendons of the fingers, and have still succeeded in preventing the death of the tendon and in accomplishing a

perfect restoration of the sheath of the sinew. The fingers, under proper orthopædic after-treatment, recovered their full moving power. I mention these successes in order to place in a prominent light the safety and efficiency of operations of the kind that engage us when conjoined with antiseptic treatment. Under all circumstances I recommend practitioners most urgently, on no account to disregard the antiseptic method in cases of extensive disease of the fascia, when the soldering together of skin with tendon-sheath and bone necessitates recourse to somewhat extensive operative measures.

I close this communication with the account of a failure, fortunately the only one, observed at Bonn, and leave it to the judgment of the reader to say whether this failure can be charged to our method or not. The medical adviser of the patient, and, what is more, the patient himself, believing that a failure of the kind may be guarded against in future, have determined that an operation shall be performed before long on the other hand, which is also affected.

A gentleman, aged fifty-five, had the ring and little fingers of the right hand so much contracted that their tips were all but in contact with the palm, the fascia of the vola of the hand being at the same time very deeply implicated. Nevertheless, we were able to effect the nearly perfect straightening of the fingers after raising a flap of skin, and dividing the diseased bands. The incisions in this case were certainly very deep, but this seemed to have no ill effect. During the first few days Lister's carbolised gauze was applied, by which the discharge from the wound was reduced to a minimum. Thiersch's salicyl wadding was then substituted for the carbolised dressing. The medical attendant superintending the after-treatment, fully explained to the patient—a chemist—the object of and the scientific reasons for the antiseptic treatment. On the eleventh day after the operation, when the dressing had not been changed for three days, the patient, being asked how he felt, declared that he was quite well in himself, and not otherwise inconvenienced by the wound than by a sense of itching—evidence, as he thought, that the healing process

was going on favourably. Cautioned not to remove the dressings, he said, with a knowing look, "that he was not such a fool as to do so. When the itching is troublesome," said he, "I insinuate the blade of my pocket or dinner knife under the bandage and scratch a little, without disturbing the bandage." On hearing this, the bandage was at once removed, when its inner parts were found extremely offensive. The coagulum of blood which since the operation had covered the wound, had disappeared, and blue, stinking pus had taken its place. The edges of the wound were red and inflamed, and the hand up to the wrist was oedematous. In spite of the renewed application of strong antiseptic means, the inflammation spread rapidly. An abscess, unconnected with the joint, formed on the vola of the wrist, and had to be opened. The tendon of the little finger became denuded in the bottom of the operation wound, accompanied by a copious secretion of pus. Necrosis of part of it occurred, but was happily of very limited extent. The final result was the following:—The ring-finger could be straightened and flexed easily and completely, whilst the little finger could only be passively moved in its several articulations, and stood in an almost completely extended position. The patient could flex the whole finger but slightly—indeed, it has become such a hindrance for his trade, that its amputation would be quite justifiable.

I repeat once again, that this is the only case in which, after the employment of the operative procedure in use at Bonn, the power of using the hand has been *partially* lost.

A patient whose hands had been operated on by Busch's method for contractions of the fingers in the very highest degree, and a great number of casts in plaster of Paris of hands that had been operated on by the same procedure, were shown by me at the Fourth Congress of the German Society for Surgery, held at Berlin on the 21st of April of this present year 1876.

Bonn, 16th May 1876.